constructing the SSE, and disposing of waste to an engineered facility. All contaminated materials from the ancillary facilities and some contaminated materials from the reactor facility would be removed and disposed at the ERDF, reducing the potential for a contaminant release. The portions of the reactor within the shield walls would not be demolished, but would be encapsulated in a concrete and metal enclosure. This would reduce the potential for a release of remaining contaminants. Protection would be continued throughout S&M of the SSE until the block disposition work starts in about 2060. Because most of the ancillary facilities would have been demolished, the number of areas that would require S&M would be reduced, thereby reducing the potential for exposing workers to contamination. Additionally, the SSE would be monitored remotely and inspections would be reduced to a 5-year schedule, further decreasing the potential for worker exposure. During implementation of these activities, there would be a potential for worker exposure and the potential for release of contaminants. However, the use of proven control technologies and strict adherence to safety and environmental regulations during these activities would significantly minimize these risks. Additionally, lessons learned are applied from the performance of this work conducted at the 105-C, 105-D, 105-DR, 105-F and 105-H Facilities.

Alternative III would also provide overall protection of human health and the environment. For the duration of the S&M period limited protection will be provided by continued S&M (2018 for ancillary facilities and 2060 for the 105-KE and 105-KW Reactor Facilities). At the end of the S&M period, assessment, D4, and waste disposal would provide more permanent protection as described in Alternative II. There would be a potential for worker exposure and a potential for a release of contaminants to the environment during both the S&M period and the eventual D4 activities. However, the use of proven control technologies and strict adherence to safety and environmental regulations would significantly reduce these risks. There are uncertainties regarding the ability to maintain the integrity and protectiveness of the 105-KE and 105-KW Reactor Facilities during the remaining years of the S&M period. The number and magnitude of repairs would likely increase, and some repairs would potentially be insufficient to maintain facility integrity. No specific issues have been identified, but there would be risks associated with unpredictable events, such as a fire or earthquake. In addition, public and worker access would be restricted until D4 is implemented. Remediation of the 100-KR-1/100-KR-2 OU waste sites would be delayed until the facilities undergo D4. Both alternatives would achieve the same end state, but the Alternative III would take longer.

Based on this analysis, Alternative I would fail to provide overall protection, whereas Alternatives II and III both provide overall protection of human health and the environment, and are considered viable alternatives.

5.1.2 Compliance with ARARs

This criterion addresses whether a removal action will, to the extent practicable, meet ARARs and other federal and state environmental statutes. The ARARs must be met for onsite CERCLA actions (CERCLA, Section 121[d][2]). Onsite actions are exempted from obtaining federal, state, and local permits (CERCLA, Section 121[e][1]). Nonpromulgated standards are also to be considered, such as proposed regulations and regulatory guidance, to the extent necessary for the removal action to be adequately protective. The ARAR criterion must be met for an alternative to be eligible for consideration.

Key ARARs associated with the two remaining alternatives include waste management standards, standards controlling releases to the environment, health standards, and standards for protection of cultural and ecological resources. The actions proposed for both alternatives would meet these preliminary ARARs, although the potential for noncompliance with standards for controlling releases to the environment and standards for safety and health could increase as the facilities age under Alternative III. A detailed discussion of how the removal action alternatives would comply with ARARs is provided in Appendix C, including other advisories or guidance documents to be considered. Final ARARs to be met during implementation of the selected removal action will be documented in the CERCLA action memorandum associated with this EE/CA.

5.1.3 Long-Term Effectiveness and Permanence

The long-term effectiveness and permanence criterion addresses whether the alternative leaves an unacceptable risk after the removal action has been taken. It also refers to the ability of a removal action to maintain long-term, reliable protection of human health and the environment after removal action objectives have been met.

Alternative II is protective of human health and the environment for the long term and provides a permanent remedy for many of the facilities covered by this EE/CA in the early years of implementation. Most of the contamination and contaminated structures would be removed and disposed, thereby creating an effective and permanent remedy with regard to the facilities. The SSE structure would be designed to last through the S&M period with proper maintenance and monitoring; therefore, this component of the alternative would provide an effective solution for containing the contamination in the reactor blocks for the long term. This alternative would provide a permanent solution with respect to the facilities and would involve planning for the transportation and disposal of the reactor blocks to the 200 Area Plateau during the ISS period.

Under Alternative III, S&M would be carried out until the eventual D4 of the facilities, to occur by 2018 for ancillary facilities and by 2068 for the 105-KE and 105-KW Reactor Facilities. Therefore, this alternative would eventually be as effective as Alternative II in protecting human health and the environment in the long term, although the efforts to maintain that level of protection would necessarily become increasingly aggressive as the facilities age. Because contamination would be left in place with this alternative, the risk of exposure and release would remain and increase with time. Therefore, over the long term, effectiveness of this alternative to remain protective may actually diminish. Planning for the transportation and disposal of the reactor block would be required during the S&M period.

Alternatives II and III provide permanent and protective solutions for facilities and require planning for the transportation and disposal of the reactor blocks following the S&M period. The facilities would be decontaminated and demolished, and contaminated materials would be disposed in the ERDF, which would provide reliable protection. Alternative II is considered to achieve long-term protectiveness more effectively than Alternative III. Under Alternative II, facilities would be addressed much earlier than in Alternative III. Also, the SSE structure that would be constructed as part of Alternative II would provide better long-term protection of human health and the environment for contamination associated with the reactor blocks.

5.1.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

Reduction of toxicity, mobility, or volume through treatment technologies may be employed in a removal action. This criterion assesses whether the alternative permanently and significantly reduces the hazard posed through application of a treatment technology. Destroying the contaminants, reducing the quantity of contaminants, or irreversibly reducing the mobility of contaminants could accomplish this. Reduction of toxicity, mobility, and/or volume through treatment contributes to overall protectiveness.

Both Alternatives II and III would generate waste that might require treatment to meet waste acceptance criteria at the ERDF or other disposal facilities. However, the fraction of waste requiring treatment would likely be low, and neither alternative would involve a specific treatment technology as part of the removal action. The volume of waste requiring treatment would be the same for both alternatives. Therefore, toxicity, mobility, or volume would not be significantly reduced through treatment with either alternative, and both alternatives would be equally effective for this criterion. Both alternatives would involve segregation activities and employ recycling options for noncontaminated material to reduce the volume of material disposed.

5.1.5 Short-Term Effectiveness

The short-term effectiveness criterion refers to an evaluation of the speed with which the remedy achieves protection. The criterion also refers to any potential adverse effects on human health and the environment during the implementation phases of the removal action.

There would be a potential for worker exposure and releases to the environment in implementing both Alternatives II and III. During implementation, Alternative II would increase potential exposure to workers early in the removal action, because the workers would be entering contaminated facilities more often and would be handling contaminated materials as part of D4. The handling of contaminated materials would also increase the potential for a release to the environment, especially to the air. Strict adherence to all appropriate environmental regulations would ensure that the potential to release would be minimized. Limiting workers' time in contaminated areas and providing the necessary protective clothing and equipment appropriate to the tasks would mitigate the risk to workers.

During the long-term S&M period following the construction of the SSE structure, the potential for a release to the environment or exposure to workers would decrease substantially. All contaminated materials from the ancillary facilities and some contaminated materials from the reactor building would be removed and disposed at the ERDF, reducing the potential for a contaminant release. The portions of the reactor facility within the shield walls would not be demolished but would be encapsulated in a concrete and metal enclosure, containing any remaining contamination inside. This would reduce the potential for a release of remaining contaminants. Because many of the ancillary facilities would have been demolished, the number of areas that would require S&M would be reduced, thereby reducing the potential for exposing workers to contamination. Additionally, the SSE would be monitored remotely and inspections would be reduced to a 5-year schedule, further decreasing the potential for worker exposure. The long-term S&M of the SSE in Alternative II would continue through 2060, followed by the D4 of the SSE and shield walls and removal of the reactor blocks prior to 2068. However, the key removal action objectives would have been achieved and the potential risks to human health and the environment would be significantly reduced in the short term.

Alternative III would protect the environment in the near term by maintaining the facilities in a condition that would minimize the potential for a release. There would be a potential for exposure to workers during the S&M period as they enter the contaminated facilities to perform work. This potential for exposure would become greater as the facilities deteriorate and the need for increased surveillance and major repairs arises. There would be a further increase in worker exposure and the potential for a release (comparable to Alternative II) when the reactor facilities finally undergo D4 in the 2060 to 2068 time frame. The removal action objectives would not be achieved until the end of that period.

Both alternatives ultimately achieve the same end state. Because this end state would be achieved earlier by implementing the Alternative II, it is considered more effective in achieving protectiveness in the short-term. The risk to workers and potential for releases would likely be greater with Alternative II early in the removal action. Once facilities are decontaminated and demolished and the SSE structure is constructed, the potential for exposure or a release would be significantly reduced. Exposure and the potential for a release would increase over time in Alternative III, with a peak when D4 finally occurs (in 2018 for ancillary facilities, in the 2060 to 2068 time frame for the 105-KE and 105-KW Reactor Facilities). Thus, over the entire period, Alternative II would have a lower potential for worker exposure and releases to the environment. In addition, Alternative II would have fewer uncertainties with respect to its ability to ultimately achieve protectiveness than Alternative III.

5.2 IMPLEMENTABILITY

Implementability refers to the technical and administrative feasibility of a removal action, including the availability of materials and services needed to implement the selected solution.

Alternative II can be implemented. Environmental restoration workers at the Hanford Site are experienced in performing D4 and waste disposal operations. In addition, DOE has successfully completed the ISS project for the 105-C, 105-D, 105-DR, 105-F, 105-H Facilities. Techniques and lessons learned from those projects would be applied to the ISS of the 105-KE and 105-KW Reactors, as well as the D4 of ancillary facilities. The specialized skills that would be required to design and construct the SSE are readily available within the existing work force at the Hanford Site. Materials that would be needed to complete the SSE are easily obtained. In terms of waste disposal, the ERDF has been designated by a ROD (EPA 1995) to receive CERCLA wastes generated on the Hanford Site that meet its acceptance criteria. The facility has already been constructed and has been in operation for several years. Procedures for handling waste at the ERDF are well established. Therefore, the facility and processes for disposal of waste generated under this alternative are readily available. Implementation of S&M following D4 and construction of the SSE structure is efficient because the buildings addressed in this EE/CA would be eliminated and S&M requirements for the stabilized 105-KE and 105-KW Reactors would be significantly reduced.

Alternative III also could be implemented. S&M techniques are widely used throughout the Hanford Site, and no specialized materials or services would be required except when major repairs would be needed on a contaminated facility. As time passes, the primary difficulty with implementation would be the increasing deterioration of the facilities. This would result in possibly increasing the potential for worker exposure or physical hazards, although these risks would be mitigated through appropriate health and safety precautions. The deterioration would also present increasing challenges in attempting to maintain the integrity of the facilities to prevent contaminant releases. The difficulty in implementing D4 at the end of the S&M period would be comparable to Alternative II, except that there would be no need to construct the SSE structure for the 105-KE and 105-KW Reactors. The Hanford Site work force would likely have decreased by 2060, affecting the availability of a trained work force; minimum specialized skills would be required for D4, so construction labor forces could be drawn from the surrounding community, if necessary. The availability of a waste disposal facility would be uncertain. The ERDF is likely to be closed by that time. Either the ERDF would need to be reopened and expanded and operations resumed, or another waste disposal facility would be required.

Both Alternatives II and III can be implemented, although Alternative III would require additional negotiation with the Tri-Parties to modify existing milestones as noted in Section 4.3. In the near term, Alternative III is easier to implement because it would not include the engineering and design phases that would be associated with construction of the SSE structure, as in Alternative II. However, in the long term, implementation of Alternative III becomes less feasible, as S&M activities would become more aggressive and more frequent and present greater worker protection and engineering challenges. Additionally, with ancillary facility removal deferred until at least 2018, Alternative III presents an implementation issue with respect to maintaining remediation progress because access to some of the 100-KR-1/100-KR-2 OU waste sites will not be available until that time. In contrast, the long-term S&M activities required for Alternative III would be very feasible because the facilities would be gone and the SSE structure would require minimal S&M. Overall, Alternative II would be expected to be more favorable to implement than Alternative III, based on previous experience, available resources, operational disposal facilities, and an experience work force.

5.3 COST

The cost criterion evaluates the cost of the alternatives and includes capital, operation and maintenance, and monitoring costs. Neither cost estimate for Alternative II or III includes costs required for demolition of the SSE portion of the reactor, or transport and disposal of the 105-KE and 105-KW Reactor blocks. All of the costs included in this document are estimates and were developed for use herein as explained in Appendix B. A summary of the various cost estimates used in this analysis in shown in Table 5-2.

Table 5-2. Cost Summary.

Cost Elements	Nondiscounted Alternative II	Discounted Alternative II	Nondiscounted Alternative III	Discounted Alternative III
All S&M - to include reactor buildings (with roof replacements) and all ancillary facilities			$ 13,924,695	$ 9,108,969
D4 of ancillary facilities	$ 34,687,941	$ 31,214,984	$ 34,687,941	$ 24,047,755
D4 of 105-KE and 105-KW without SSE			$ 25,157,349	$ 4,838,346
D4 of 105-KE and 105-KW with SSE	$ 33,461,609	$ 30,111,447		
Long-term S&M of SSE	$ 1,440,000	$ 665,405		
D4 waste from 105-KE and 105-KW	$ 2,080,142	$ 1,871,878	$ 2,080,142	$ 400,060
D4 waste from ancillary facilities	$ 8,832,920	$ 7,948,568	$ 8,832,920	$ 6,123,508
Alternative Totals	$ 80,502,612	$ 71,812,282	$ 84,683,047	$ 44,518,638

D4 = deactivation, decontamination, decommissioning, and demolition
S&M = surveillance and maintenance
SSE = safe storage enclosure

As stated in Section 4.3, several uncertainties are associated with the cost estimate for Alternative III. The cost to maintain the facilities cannot be accurately predicted and therefore cannot be accurately reflected in these cost estimates. If the facilities were to deteriorate at a rapid rate and repairs were inadequate to maintain protection of workers, the public, and the environment, D4 of the reactor building may need to be started before 2060 and before 2018 for ancillary facilities. The cost of major repairs (beyond the reactor building roof replacements) cannot be predicted and would be difficult to justify for a structure awaiting demolition. Therefore, the estimated cost of Alternative III represents a minimum.

In addition, since the majority of the actions (and costs) in Alternative III are well in the future, the discounted costs presented are significantly skewed. For instance, since the reactor D4 actions are 54 years in the future, and the EPA guidance (EPA 2000a) does not allow escalation of these cost estimates, the discounted value is less than 20% of the cost to perform the work today. Similar disparities can be seen in the other line items to a lesser degree (since the performance periods start sooner). When common actions such as all D4 actions and all waste disposal costs are removed from this cost analysis; a comparison of the remaining unique items can be made. The comparison of these remaining actions, SSE installation and S&M compared to S&M of both reactors (including periodic roof replacement) and S&M of all of the ancillary facilities is shown in Table 5-3.

Table 5-3. Unique Actions Cost Comparison.

Unique Actions	Nondiscounted Alternative II	Discounted Alternative II	Nondiscounted Alternative III	Discounted Alternative III
All S&M - to include reactor buildings (with roof replacements) and all ancillary facilities			$ 13,924,695	$ 9,108,969
SSE installation	$ 8,304,260	$ 7,472,840		
Long-term S&M of SSE	$ 1,440,000	$ 665,405		
Alternatives Totals for Comparison	**$ 9,744,260**	**$ 8,138,245**	**$ 13,924,695**	**$ 9,108,969**

S&M = surveillance and maintenance
SSE = safe storage enclosure

5.4 OTHER CONSIDERATIONS

Secretarial policy (DOE 1994) and DOE O 451.1B, *National Environmental Policy Act Compliance Program* (DOE 2000), require that CERCLA documents incorporate NEPA values such as analysis of cumulative, offsite, ecological, and socioeconomic impacts to the extent practicable, in lieu of preparing separate NEPA documentation for CERCLA activities. The NEPA regulations (40 CFR 1502.16) specify evaluation of the environmental consequences of proposed alternatives. These include the following potential effects:

- Transportation resources
- Air quality
- Cultural and historical resources
- Noise, visual, and aesthetic effects
- Environmental justice
- Socioeconomic aspects of implementation.

The NEPA process also involves consideration of several issues such as cumulative impacts (direct and indirect), mitigation of adversely impacted resources, and the irreversible and irretrievable commitment of resources. A NEPA values evaluation of Alternatives II and III is presented in the following subsections. Alternative I is excluded from the evaluation because it failed to meet the overall protection threshold criterion documented in Section 5.1.1.

5.4.1 Transportation Impacts

Neither of the removal alternatives would be expected to create any long-term transportation impacts. Alternative II would have short-term impacts on local Hanford Site traffic associated with transportation of waste, equipment, and personnel. Demolition debris and contaminated soil would be transported from the 100-K Area to the ERDF. Alternative II would occur on the Hanford Site, primarily on roads where public access is restricted. Minimal offsite impacts would be expected from transportation of waste to offsite sanitary landfills.

Alternative II would also involve transportation impacts from supplying equipment and materials to the 100-K Area and from increases in the work force traffic. This should have minimal impact on the transportation infrastructure.

Alternative III should have minimal transportation impact during implementation of long-term S&M. Use of roadways and the traffic would be minimal. However, the roadways associated with 100-K Area would need to be maintained. The roads would need to be available for D4 of the ancillary facilities starting in 2018 and the reactor facilities and reactor block in 2060. Roads would also be required to support the S&M of 105-KE and 105-KW until 2060. Transportation impacts during D4 of the buildings and final disposition of the reactor blocks would be similar to those described for Alternative II. Long-term S&M would delay these impacts and potentially require that roadways be maintained in good condition for a longer period of time.

If adverse impacts to transportation were detected, activities would be modified or halted until the impact is mitigated. Potential mitigation measures for transportation include preparing a transportation safety analysis to identify the need for specific precautions to be taken before any transport activities, closing roads during waste transportation, or use of the existing rail infrastructure.

5.4.2 Air Quality

Potential air quality impacts are associated with each alternative that have not been quantified, but these impacts would be minor based on experience with D4 and ISS activities at other facilities. Both alternatives would have potential air quality impacts associated with fugitive emissions of contaminants during facility demolition. There also would be potential dust emissions associated with excavation of backfill at borrow sites and placement of the material in the 100-K Area. Impacts would be the same for the two alternatives, but would occur later for Alternative III. Potential emissions would be quantified during design to ensure that emissions are controlled to below allowable limits. No impacts on local or regional air quality would be expected as long as appropriate fugitive emission and dust control measures are implemented. Potential mitigation measures for air resources include the following:

- Removing or stabilizing facility contaminants before demolition
- Using local exhaust and containment systems during demolition
- Packaging and handling wastes to prevent releases
- Implementing dust suppression measures (both water and water treated with fixatives) to control fugitive dust

- Covering loads when hauling wastes and backfill materials

- Preparing an air monitoring plan before beginning field work.

5.4.3 Natural, Cultural, and Historical Resources

The potential impacts to natural, cultural, and historic resources are discussed in the following subsections.

5.4.3.1 Natural Resources. Natural resources include biological resources such as wildlife habitat, plants, and animals; physical resources such as land, water, and air; and human resources such as remediation workers. As documented in Section 2.0, the area within the 100-K Area perimeter road is highly disturbed from industrial operations and does not include any sensitive biological areas. Potential impacts to biological resources would be a greater concern at buildings located outside the perimeter road (181-KW River Pumphouse, 181-KE River Pumphouse, and 1908-KE Outfall) and borrow sites because they could be located in otherwise undisturbed areas. As discussed in Section 2.1.3 there is a potential to disturb the nesting of migratory birds; therefore, mitigating measures must be taken to protect those nests during nesting season. Potential adverse impacts at the ERDF, which is located in an area of high-quality shrub-steppe habitat, were addressed in the *Remedial Investigation and Feasibility Study Report for the Environmental Restoration Disposal Facility* (DOE-RL 1994b). Both alternatives would also have positive impacts on biological resources because the potential for exposure to contaminants would be minimized through removal. Potential impacts to air resources were discussed previously. For both alternatives, there is also a potential for impacts to land and water resources if contaminants were to be released during the removal action. As facilities are demolished, there would be a potential for precipitation to contact contaminants and carry them to the soil, where they could then migrate to groundwater. Measures that would be implemented to mitigate potential impacts include the following:

- Stockpiling clean topsoil during site preparation for use as backfill
- Minimizing the size of construction areas
- Performing ecological surveys before remediation
- Avoiding work in the area of a nest during the nesting season
- Locating borrow sites in areas that would only impact low-quality habitat such as cheatgrass
- Revegetating disturbed areas (as applicable)
- Making borrow sites deeper to minimize the lateral extent of disturbance
- Providing engineering/administrative controls and protective equipment for workers.

Impacts would be the same for Alternatives II and III, but would occur later for Alternative III.

5.4.3.2 Cultural Resources. Cultural resources are unlikely to be encountered during activities at facilities located within the 100-K Area perimeter road because this area is heavily disturbed from past operations, as discussed in Section 2.0. Cultural resources might be present at facilities located outside the perimeter road and borrow sites, which are typically located in otherwise undisturbed areas. Adverse impacts to cultural resources could occur if such resources are encountered and appropriate mitigating actions are not taken. A cultural resource mitigation plan has been prepared to guide activities, including avoiding known cultural resources and traditional-use areas whenever possible, conducting cultural resource reviews before subsurface intrusion or facility demolition, and training construction workers to recognize and report potential cultural resources. If cultural resources are encountered, the State Historic Preservation Office and Native American tribes would be consulted to determine appropriate actions for mitigation, resource documentation, or recovery.

5.4.3.3 Historical Resources. As documented in Section 2.0, several facilities in the 100-K Area meet the NHPA criteria for consideration as historically significant properties. A programmatic agreement (DOE-RL 1996) requires that DOE assess the contents of the historic buildings and structures before any future D4 activities can be conducted. An associated treatment plan (DOE-RL 1998) identifies those facilities, including facilities in the 100-K Area, recommended for individual documentation. As described in Sections 2.1.4 and 4.4.1, appropriate documentation has been completed for the contributing facilities in the 100-K Area. Interior assessments of the 100-K buildings have been conducted to identify and tag artifacts that may have interpretive or educational value. Tagged items would be removed from facilities and transferred to safe storage, or photographed, before any activity took place that would disrupt such items.

5.4.4 Noise, Visual, and Aesthetic Effects

Both alternatives would increase noise levels, but the impacts would be of short-term duration during removal actions and would not affect offsite noise levels. Positive impacts on visual and aesthetic effects would be realized, but the benefits would occur earlier with Alternative II. The existing footprint and skyline of the 105-KE and 105-KW Reactors would be reduced significantly and the existing above-grade structures of facilities addressed in this EE/CA would be removed, and the sites would be backfilled and contoured to natural grade.

5.4.5 Socioeconomic Impacts

The local economy is closely tied to Hanford Site employment, so changes in the work force associated with the facilities addressed in this EE/CA could potentially affect local socioeconomics although impacts would be relatively small compared to the current Hanford Site work force. In the near term, the work force required for Alternative III would be small. In the long term, Alterative III may require support from non-Hanford Site work forces, but the number of resources would not be large and this would not be expected to have a significant cumulative impact on the community. Personnel required to implement Alternative II would be selected from existing S&M and remediation work force resources at the Hanford Site, or the opportunity to fill these positions would be made available to subcontractors. The alternatives would meet the principles established by the Hanford Advisory Board Work Group for cultural/socioeconomic impacts and allow for workforce transition to cleanup activities. Effects on community social services, public services, and recreation would probably be imperceptible because so few employees would be involved. No mitigation measures have been identified for socioeconomics.

5.4.6 Environmental Justice

Health or socioeconomic impacts to any of the local communities would be minimal for both alternatives, so environmental justice issues (i.e., high and disproportionate adverse health and socioeconomic impacts on minority or low-income populations) would not be a concern.

5.4.7 Irreversible and Irretrievable Commitment of Resources

Removal actions at the facilities included in the scope of this EE/CA could require an irreversible or irretrievable commitment of resources, particularly land use and geologic materials.

Under both alternatives, there would be a loss of land use because land area at the ERDF would be irretrievably committed for disposal of D4 waste. Disposal of waste cannot be avoided, and the ERDF is designed to minimize land committed for disposal. Irretrievable land commitment at the ERDF is mitigated by a substantial gain in land use at the sites where the facilities are located and a reduction of risk of contaminant exposure to the natural resources at the 100-K Area. The facilities would eventually be removed. In combination with future soil cleanup, this would allow for unrestricted future surface use at these sites as defined by the remedial action program. Contamination above cleanup standards might remain at depth, even after soil contamination is addressed in accordance with the remedial action program requirements, and this would require restrictions on deep excavations and well drilling. However, achieving unrestricted surface use at the sites would substantially benefit the natural resources as compared to current use restrictions. The Alternative III would require additional land-use restrictions during the interim phase, until D4 is performed.

Both alternatives would also require an irretrievable and irreversible commitment of resources in the form of petroleum products (e.g., diesel fuel and gasoline) and geologic materials required to backfill and recontour the sites following D4. Geologic material would be obtained from onsite borrow pits. To the extent practicable, measures would be taken to minimize the quantity of backfill required. Quantities of required petroleum and geologic resources would be essentially the same for both alternatives, although Alternative II would use more of these resources in the near term and Alternative III would require slightly more fuel during the longer S&M period. In addition, there would be a small increase in the amount of material required for the closure barrier at the ERDF.

5.4.8 Cumulative Impacts

Removal actions at facilities included in the scope of this EE/CA could have impacts when considered together with impacts from past and foreseeable future actions at and near the Hanford Site. Authorized current and future activities in the 100-K Area that might be ongoing during removal actions include soil and groundwater remediation, removal and storage of spent nuclear fuel and sludge from the K Basins, and S&M of facilities. Other Hanford Site activities include D4 of a variety of facilities, soil and groundwater remediation, operation and closure of underground waste tanks, construction and operation of tank waste vitrification facilities, and operation of the Energy Northwest commercial reactor. Activities near the Hanford Site include a privately owned radioactive and mixed waste treatment facility, a commercial fuel manufacturer, and a titanium reprocessing plant.

Both removal action alternatives would have minimal impacts on transportation; air quality; natural, cultural, and historical resources; noise, visual, and aesthetic effects; public health; and socioeconomics. Therefore, cumulative impacts with respect to these values are expected to be insignificant. Cumulative impacts could occur with respect to the irretrievable and irreversible commitment of resources and funding priority.

Both alternatives would require excavation of geologic material from borrow sites for backfill and cover, resulting in an irretrievable and irreversible commitment of geologic materials. The proposed 100-K Area actions constitute only one of numerous actions requiring material for barriers and backfill at the Hanford Site. The total quantity of geologic materials required for Hanford Site actions was evaluated in separate NEPA documentation.

Both alternatives could also require long-term land-use restrictions in the 100-K Area in the form of restrictions on subsurface access. As documented in Section 2.0, the future land use in the 100 Area is anticipated by DOE to be preservation/conservation. Consequently, the land-use restrictions that would be imposed by either alternative would be compatible with other decisions and would not result in a cumulative impact for land use.

6.0 RECOMMENDED ALTERNATIVE

The recommended alternative for the 105-KE and 105-KW Reactor Facilities and the remaining ancillary facilities included in the scope of this EE/CA is Alternative II: ISS of the 105-KE and 105-KW Reactors followed by long-term S&M, and D4 of the ancillary facilities and portions of the 105-KE and 105-KW Reactor Facilities. This alternative includes deactivation where needed, demolition of the buildings, removal of contaminated waste/demolition debris, disposal of the material at the ERDF or another approved facility and is consistent with the remedial action to be taken per 40 CFR 300.415(b)(5)(ii). This alternative also requires maintaining the Hanford Site institutional controls during the long-term S&M of the SSE.

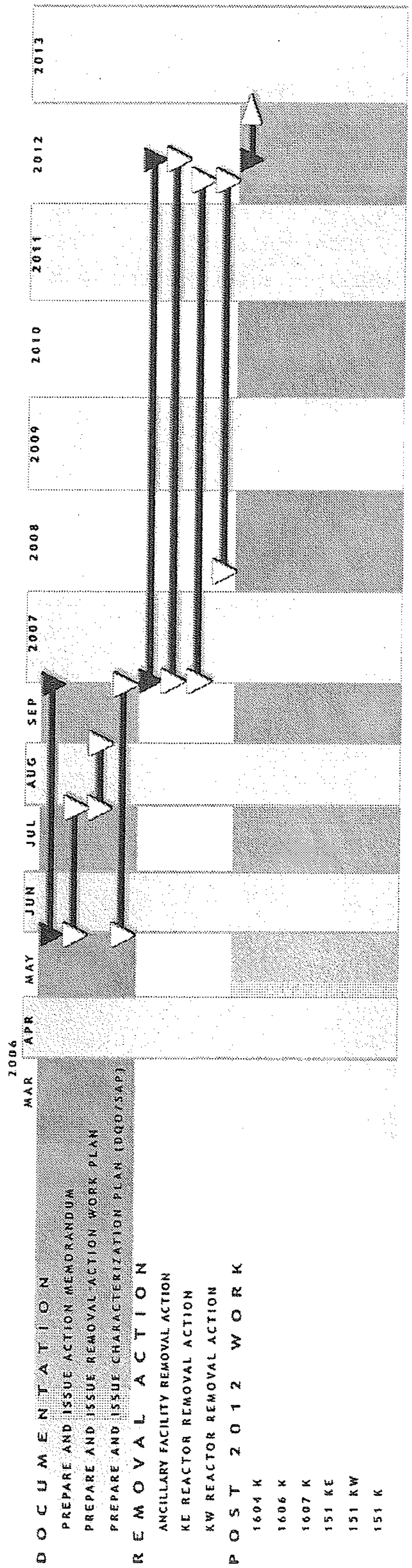
Alternative II is recommended based on its ability to provide increased protection to human health and the environment and its effectiveness in maintaining that protection in both the short term and the long term. The alternative removes the threat to the public and the environment associated with exposure to unacceptable levels of radioactive and chemical contaminants under future land-use scenarios. In addition, Alternative II would allow more timely implementation of the 100-KR-1/100-KR-2 OU remedial actions and would eliminate unnecessary costs and potential hazards associated with an extended S&M program and increasing age of the buildings. Additionally, no Tri-Party Agreement milestone modifications would be needed for implementation of Alternative II.

The estimated cost of implementing Alternative II for buildings included in the scope of this EE/CA is $80.5 million.

7.0 SCHEDULE

For information purposes only, Figure 7-1 provides a fiscal year schedule for the proposed removal action alternative. The sampling and analysis plans (for waste characterization and soil/concrete verification) and the RAWP will be submitted to the regulatory agencies for approval. A more detailed schedule for conducting the removal action will be included in the RAWP. The current planning baseline calls for completing the removal action for necessary buildings in time to support remediation of all sites in the 100-K Area by 2012.

Figure 7-1. Schedule.



8.0 REFERENCES

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40 CFR 300.440, "Procedures for Planning and Implementing Off-Site Response Actions," *Code of Federal Regulations,* as amended.

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